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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,039	08/10/2006	Stephen Burgess	06-01 US	4037

23693 7590 06/10/2009

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EXAMINER	
ROJAS, BERNARD	
ART UNIT	PAPER NUMBER
2832	
MAIL DATE	DELIVERY MODE
06/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,039	BURGESS ET AL.	
	Examiner	Art Unit	
	BERNARD ROJAS	2832	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-8,11,13,15-24 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-8,11,13,15-24 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Muller et al. [US 5,220,800].

Claim 13, Muller et al. discloses superconducting magnet [superconductive magnet coil 3, Fig. 1] system comprising: a cryogenic vessel [first chamber 1, Fig. 1]; a superconducting magnet [superconductive magnet coil 3, Fig. 1] contained in an inner chamber within the vessel [chamber 1 within cooling tank 23, Fig. 1] to be cooled by liquid helium at a temperature of below 4.2 K within the inner chamber [liquid helium is cooled to a temperature T<<4.2K when provided to the first chamber; therefore, the superconducting magnet coil in a bath of super fluid helium is very effective in temperature controlling, wherein the first chamber 1 represents the bath; Col. 2, line 59-Col. 3, line 10]; an outer chamber surrounding the inner chamber, the outer chamber holding a supply of liquid helium at a temperature of about 4.2K [Muller discloses a cryostat that two concentric helium tanks nested within one another wherein the outer tank contains liquid helium at T= 4.2K under standard pressure and this helium is fed from the outer tank into the inner tank, see Col. 2, lines 2-12.], a removable current lead [superconducting magnet coil 3 is energized with electrical current by means of

electrical leads, Col. 9, lines 64-65; wherein the leads are removed, Col. 10, lines 1-3], which supplies current to the magnet via a supply passage extending through the wall of the vessel in order to initiate superconducting current flow in the magnet [pass through tube 18 for the valve stem 7 of the refrigerator 6 for the electrical leads to the superconducting magnet coil 3, Col. 9, lines 54-60; electrical leads are guided through the further chamber 2 before entering the first chamber 1 and are thus pre-cooled, Col. 9, lines 64-68], and subsequently stopping the supply of current to the magnet whilst the superconducting current flow persists in the magnet and the current lead is withdrawn from the supply passage [in general, for a superconducting magnet coil, the magnet coils are energized once, and then generate a homogeneous magnetic field for years after the leads are removed, Col. 1, lines 40-43]; liquid helium supply means [further chamber 2 holding approximately 180 liters of liquid helium where the liquid helium flows from the further chamber 2 to the first chamber 1; Col. 8, lines 8-35] for supplying a valve which supplies, after an extended period of superconducting current flow in the magnet and without stopping the superconducting current flow, liquid helium at a temperature of about 4.2 K to an upper part of the inner chamber above the magnet [by means of a valve 32, pumps liquid helium out to the first chamber 1 for expansion, thus super cooling the helium bath in the first chamber, Col. 8, lines 25-35; wherein the refrigerator cools the helium to a temperature T<<4.2K] where the magnet is surrounded by liquid helium at a temperature of below 4.2 K [the superconducting magnet coil is in a super cooled helium bath, Col. 2, lines 26-30], and subsequently stops the supply of liquid helium to the inner chamber by closing the valve[closing of the

valve, Col. 10, lines 33-36]; and cooling means, which cools the liquid helium in the upper part of the inner chamber to a temperature of below 4.2 K by reducing the pressure in the upper part of the inner chamber by pumping whilst the valve remains closed [the refrigerator pumps the liquid helium out thus causing the helium to expand and to super cool the helium bath, Col. 8, lines 25-35].

Claim 15, Muller et al. discloses the system according to claim 13, wherein the valve 32 has a removable actuating shaft [valve needle 39], which is removable from the valve after the supply of liquid helium to the inner chamber has stopped in order to limit heat conduction during further operation [valve needle is pulled out axially upward out of the valve orifice 40, Col. 10, lines 36-40].

Claims 1 and 5, the methods of cryogenically cooling a superconducting magnet are inherent in the product structure of claims 13 and 15 as shown in the rejection above by Muller et al.

Claim 2, Muller et al. discloses the method according to claim 1, wherein the magnet is cooled by the liquid helium within the inner chamber to a temperature of below 2.5 K [helium forming the bath of for the magnet is cooled to T<<4.2K, specially T~ 1.8-2.3K, Col. 2, lines 59-62].

Claim 3, Muller et al. discloses the method according to claim 2, wherein the magnet is cooled by the liquid helium within the inner chamber down to a temperature below the lambda point (2.17 K) [cooling of helium below the lambda point, Col. 2, lines 59-68].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 6-8, 11, 16-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. [US 5,220,800] as applied to claims 13 and 15 above, and further in view of Matsumoto [JP 63070405A].

Claim 16, Muller et al. discloses the system according to claim 13, wherein the removable current lead [superconducting magnet coil 3 is energized with electrical current by means of electrical leads, Col. 9, lines 64-65; wherein the leads are removed, Col. 10, lines 1-3] supplies current from an external current source to the magnet via the lead through the supply passage to initiate superconducting current flow in the magnet [superconducting magnet coil is energized with current from the electrical leads, Col. 9,

lines 64-65], and with the superconducting current flow persisting in the magnet [magnet generates a homogeneous magnetic field for years after the leads are removed, Col. 1, lines 40-44], to permit withdrawal of the lead [wherein the leads are removed, Col. 10, lines 1-3] from the supply passage so as to limit heat conduction along the supply passage during further operation of the system.

Muller et al. does not teach the connector parts placed on the lead or the magnet.

Matsumoto discloses a magnet's removable lead wherein the lead is connected through a connector to both a power supply and a magnet (see constitution section of translation).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use connectors in the removable leads, as shown in Matsumoto, in order to facilitate the connection of the removable leads to the coil thus providing the initial start up current.

Claim 17, Muller et al. discloses the system according to claim 16, further comprising venting means which vents the inner chamber with helium gas without warming the liquid helium within the inner chamber to any substantial extent [venting towers 31, Col. 9, lines 1-8] to permit the lead to be withdrawn from the supply passage [pass through tube 18, Col. 9, lines 54-58].

Claim 18, Muller et al. discloses the system according to claim 17, further comprising monitoring means which monitors the level of the liquid helium in the inner chamber during operation and provides an indication of the need to supply liquid helium

at a temperature of about 4.2 K to the upper part of the inner chamber when the level of the liquid helium in the inner chamber has fallen below a predetermined level [flow monitors measure the volume of the outgoing helium and deliver the measured flow values to a flow regulation device which automatically regulates the volumes flowing into the individual towers, Col. 9, lines 8-13].

Claim 19, Muller et al. discloses the system according to claim 18, wherein the magnet is annular and is disposed with its axis horizontal within a horizontal cryogenic vessel [as shown in Figure 1].

Claim 20, Muller et al. discloses the system according to claim 19, wherein the valve is connected to a source of liquid helium external to the cryogenic vessel [chamber 2 supplies the liquid helium to chamber 1 wherein chamber 2 is external to chamber 1, Col. 8, lines 8-35].

Claim 21, Muller et al. discloses the system according to claim 18, wherein the magnet is annular and is disposed with its axis vertical within a vertical cryogenic vessel [as shown in Figure 1].

Claim 22, Muller et al. discloses the system according to claim 21, wherein the valve is connected to an outer chamber containing liquid helium at a temperature of about 4.2 K [valve 32 connected to chamber 2, Col. 8, lines 8-35], the outer chamber being contained within the cryogenic vessel [chamber 2 as shown in Fig. 1]. Muller et al. fails to disclose that the outer chamber surrounding the inner chamber. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the outer chamber to surround the inner chamber instead of being adjacent to

it, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Claim 23, Muller et al. discloses the system according to claim 22, wherein a gas-cooled shield is provided within the vessel so as to surround the inner chamber [Cooling tank 23 contains liquid nitrogen wherein liquid nitrogen becomes a gas under higher temperatures, Col. 8, lines 36-47].

Claim 24, Muller et al. discloses the system according to any claim 23, wherein an annular liquid nitrogen reservoir is provided within the vessel so as to surround the inner chamber [Cooling tank 23 contains liquid nitrogen, Col. 8, lines 36-47].

Claims 6-8 and 12, the methods of cryogenically cooling a superconducting magnet are obvious from the product structure of claims 16-24, as shown in the rejection above, by Muller et al.

Claim 28, the method of cryogenically cooling a superconducting magnet is obvious from the product structure of claims 13, 19 and 20, as shown in the rejection above, by Muller et al.

Response to Arguments

Applicant's arguments filed 03/19/2009 have been fully considered but they are not persuasive.

Applicant argues that the method steps recited include use of the valve to stop the flow of helium in distinct contrast to the disclosure of Muller. Applicant argues that in Muller warm He is continuously delivered to the cold He reservoir through a valve 32.

The examiner disagrees. Muller discloses that when the valve needle 39 completely seals the valve orifice 40, the valve 32 is the in the closed position. Therefore, when the valve 32 of Muller is in the closed position, as shown in Figure 3, the valve is stopping the flow of He. In analyzing the teachings of Muller, it is apparent that the valve 32 may be in the closed or open position (see Col. 10, lines 33-47).

Applicant argues that claim 13 has been amended to add the element comprising the outer chamber surrounding the inner chamber and to specify that outer chamber as the source where the liquid helium is derived for supplying the inner chamber. However, Muller discloses a cryostat that two concentric helium tanks nested within one another wherein the outer tank contains liquid helium at T= 4.2K under standard pressure and this helium is fed from the outer tank into the inner tank (see Col. 2, lines 2-12).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BERNARD ROJAS whose telephone number is (571)272-1998. The examiner can normally be reached on M and W-F, 10:00-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin G. Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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